CORNERSTONE EARTH GROUP

Date: November 2, 2012
Project No.: 118-37-2

Prepared For: Mr. Akoni Danielson
DAVID J. POWERS & ASSOCIATES
1871 The Alameda, Suite 200
San Jose, California 95126

Re: Geotechnical Feasibility Study
Samsung Semiconductor Corporate Headquarters
3655 North 1st Street
San Jose, California

Dear Mr. Danielson:

This letter provides the results of our geotechnical feasibility evaluation and preliminary recommendations for the site referenced above. The findings and recommendations provided herein are intended for preliminary project planning purposes only and are not intended to be used in final design or construction.

PROJECT UNDERSTANDING

We understand that Samsung Semiconductor, Inc. has proposed constructing a new corporate headquarters at their existing 9½-acre facility at 3655 North 1st Street in San Jose, California. The site is presently occupied by three two-story office buildings surrounded by asphalt concrete parking and landscaping. The site location is shown on our Vicinity Map – Figure 1. The site boundaries and existing conditions are shown on the Site Plan – Figure 2.

The proposed plans include demolition of the three existing buildings and construction of a 10-story office building (approximately 1,100,000 square feet) and a parking structure for approximately 2,500 cars. The building footprints, locations, and structural loads have not been provided to us at this time.

GEOLOGIC SETTING

GEOLOGY

The Santa Clara Valley is a sediment-filled trough located between the Santa Cruz Mountains to the southwest and west, and the Diablo Range to the northeast. The surface of the valley forms a broad alluvial plain sloping gently downward to the north toward the San Francisco Bay. The site is located at the north end of the Santa Clara Valley. Rogers & Williams (1974) map the thickness of alluvium in the site vicinity to be on the order of 600 feet.

Surficial mapping by the California Division of Mines and Geology (CDMG, 2001) indicates that the site and adjacent areas are underlain by Holocene alluvial fan deposits (Qhf). Fan deposits are described by Knudsen et al. (2000) as: "Sediment deposited by streams emanating from canyons onto alluvial valley floors or alluvial plains…Alluvial fan sediment includes sand, gravel, silt, clay, and is moderately to poorly sorted, and moderately to poorly bedded." Fan deposits in the Santa Clara Valley generally consist of clays and silts with interbedded sandy zones. As shown on the Geologic Map (Figure 3), the fans deposits in the area are further subdivided into young (Qhfy) and fine-grained (Qhff) units.

Holocene stream terrace deposits (Qhty) are mapped towards the western side of the property. Terrace deposits are deposited along stream channels and are generally more coarse-grained than fan deposits.

The site is situated between the Guadalupe River and Coyote Creek. The Guadalupe River is located approximately 1,200 feet to the west of the site. Coyote Creek is located approximately 4,800 feet to the east of the site.

REGIONAL ACTIVE FAULTS

The San Andreas Fault system is about 40 miles wide in the Bay area and extends from the San Gregorio Fault near the coastline to the Coast Ranges-Central Valley blind thrust at the western edge of the Great Central Valley. The San Andreas Fault is the dominant structure in the system, nearly spanning the length of California, and capable of producing the highest magnitude earthquakes. Many other subparallel or branch faults within the San Andreas system are equally active and nearly as capable of generating large earthquakes. Right-lateral movement dominates on these faults but an increasingly large amount of thrust faulting resulting from compression across the system is now being identified also.

A Regional Fault Map is presented as Figure 4, illustrating the relative distances of the site to significant fault zones. Known active faults within approximately 25 miles (40 kilometers) of the site are listed in Table 1.

The site is located to the west of the Silver Creek Fault Zone. The Silver Creek Fault is a blind thrust fault and not considered to be active by the State of California. Figure 5 shows the approximate location of the Silver Creek Fault as mapped by the City of San Jose (CSJ, 1983). The City of San Jose maps three reported traces of the fault.

Table 1: Regional Active Faults

Fault Name	Distance (miles)	Distance (kilometers)
Hayward	4.1	6.6
Calaveras	7.8	12.6
Monte Vista – Shannon	9.4	15.2
San Andreas	13.0	21.1
Zayante – Veregeles	21.2	34.2
San Gregorio	24.4	39.3

SITE CONDITIONS

SITE HISTORY

We reviewed aerial photographs from 1939 to 2012 and topographic maps from 1899 to 2012. The following is a brief discussion of the site history based on our review of the aerial photographs and topographic maps.

North 1st Street and Campen Avenue appear on the 1899 topographic map. At the intersection with North 1st Street, Campen Avenue is located along the current Tasman Drive alignment; however, it continues straight to the west, where it terminates at Guadalupe Creek. The site and surrounding areas are either undeveloped or used for agricultural purposes. A small structure is present in 1899 along the northeastern edge of the site.

The 1939 aerial photograph shows that the site is being used for agricultural purposes; likely field crops. In addition to the structure in the northeastern portion of the site, there is a second small structure on the site along Campen Avenue.

Between 1939 and 1972, the site and surrounding areas appear relatively unchanged. The development to the northeast of the site, across North 1st Street, was constructed between 1972 and 1982.

Tasman Drive was constructed along its present alignment between 1982 and 1983. The current development was constructed between 1983 and 1987. The development originally consisted of four two-story office buildings. An addition joined the two eastern buildings together between 1994 and 1998. The site appear to be relatively unchanged between 1998 and the present.

The development to the north of the site was constructed between 1987 and 1993. The development to the northwest of the site appears to be under construction in the 1998 aerial photograph.

SURFACE CONDITIONS

The 9½-acre site is bounded by Tasman Drive to the south, North 1st Street to the east and northeast, and commercial developments to the north. The site is presently occupied by three existing two-story office buildings surrounded by asphalt concrete parking and landscaping.

The site is relatively flat and is graded to drain towards storm drain inlets. The USGS Topographic Map for the Milpitas 7½-Minute Quadrangle indicates the site grades are at approximately Elevation 10 to 14 feet.

SUBSURFACE CONDITIONS

Seven exploratory borings have been performed on the site during previous geotechnical investigations (Engeotech, 1983; Banta, 1994). The borings are included in this letter as Attachments 1 and 2, respectively. The locations of the borings are shown on our Site Plan (Figure 2).

The previous borings encountered stiff alluvial soils to a depth of 30 feet, the maximum depth explored. The alluvial soils consisted of stiff clays and silts with interbedded layers of sand and gravel. Plasticity Index (PI) tests performed on samples of the surficial materials resulted in PI's of 24 to 33, indicating moderate to high plasticity and expansion potential.

The 1994 borings, which were performed after the initial site development, encountered up to 1½ feet of fill beneath the surficial pavement.

GROUND WATER

Ground water was encountered in the previous borings at depths of 13 to 15 feet. The measurements appear to have been taken at the time of drilling or shortly following drilling and may not represent the stabilized ground water levels.

The California Division of Mines and Geology (2001) maps the historic highest depth to ground water in the vicinity if the site as approximately 6 to 7 feet. Fluctuations in ground water levels occur due to many factors including seasonal fluctuation, underground drainage patterns, regional fluctuations, and other factors.

GEOLOGIC HAZARDS

FAULT RUPTURE

As discussed above, several faults are located within 40 kilometers of the site. The site is not located within a currently designated California Alquist-Priolo Earthquake Fault Zone (CDMG, 1982), formerly known as a Special Studies Zone, a City of San Jose Fault Hazard Zone (CSJ, 1983), or a Santa Clara County Fault Rupture Hazard Zone (SCC, 2002).

In addition to the faults listed in Table 1, the Silver Creek Fault has been mapped close to the site (Figure 5, CSJ, 1983). The Silver Creek Fault is a blind thrust fault and considered not capable of producing surface fault rupture.

No indications of active faulting were observed in aerial photographs or in the field, nor have any surface fault expressions been mapped across the site; therefore, fault rupture hazard is not a significant geologic hazard at the site.

GROUND SHAKING

The San Francisco Bay area is one of the most seismically active regions in the United States. Significant earthquakes occurring in the Bay area are generally associated with crustal movement along well-defined, active fault zones of the San Andreas Fault system.

The Working Group on California Earthquake Probabilities (2007) developed estimates of earthquake probabilities in the San Francisco Bay area for the period from 2002 to 2031. Their findings suggest the probability of a magnitude 6.7 or greater earthquake occurring during this time period in the San Francisco Bay region is 62 percent.

Moderate to severe earthquakes can be expected to cause strong ground shaking at the site. We recommend that the proposed structures be designed in accordance with the California Building Code, or other applicable code. Based on our review of available geologic maps (Wills, et al., 2000), the site may be classified as Site Class D "Stiff Soil Profile." However, as discussed below, there is a high liquefaction hazard at the site. If potentially-liquefiable materials are encountered during the design-level investigation, the site would need to be classified as Site Class F and a site-specific seismic hazard analysis would be required.

LIQUEFACTION

Soil liquefaction is a phenomenon where soils lose strength and stiffness during strong ground shaking. Soils most susceptible to liquefaction are loose, saturated non-cohesive soils, such as sands and low plasticity silts.

The site is located within a California Seismic Hazard Zone for liquefaction (CDMG, 2001) and a Santa Clara County Liquefaction Hazard Zone (Santa Clara County, 2002). Figure 6 shows the limits of the California Seismic Hazard Zone.

Due to the relatively young soils and the depth to ground water, the liquefaction hazard should be considered high. Soil liquefaction can result in ground deformations, such as ground cracks, sand boils, foundation bearing failure, and settlement of the ground surface. The liquefaction hazard at the site could likely be mitigated through foundation design.

We recommend the potential for liquefaction be evaluated during the design-level geotechnical investigation once the project plans are finalized.

LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope.

The closest free face to the site is the Guadalupe River which runs approximately 1,200 feet to the west of the site. Due to the distance to the Guadalupe River, the depth of the channel, and the lack of historical observations of lateral spreading during previous earthquakes, it is our opinion that the potential for lateral spreading to affect the site is low. The potential for lateral spreading should be further evaluated during the design-level geotechnical investigation.

LANDSLIDING

The site is not located within a California Seismic Hazard Zone for landsliding (CDMG, 2001) or a Santa Clara County Landslide Hazard Zone (SCC, 2002). Due to the relatively flat topography, the potential for landsliding at the site may be considered low.

FLOODING

The Federal Emergency Management Agency *Flood Insurance Rate Map* (FEMA, 2009) indicates that the northeastern and southwestern portions of the site are located within Zone AO. The central portion of the site is located in Zone X.

Zone AO is described as: “Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also included.”

Zone X is described as: “Areas of 0.2% annual chance floods; areas with 1% annual chance floods with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance floods.”

We recommend the project civil engineer be retained to confirm this information and verify the base flood elevation, if appropriate (FEMA, 2009).

The Association of Bay Area Governments has compiled a database of Dam Failure Inundation Hazard Maps (ABAG, 1995). The generalized hazard maps were prepared by dam owners as required by the State Office of Emergency Services; they are intended for planning purposes only. The site is not located within a dam failure inundation area.

TSUNAMIS AND SEICHES

The terms tsunami or seiche are described as ocean waves or similar waves usually created by undersea fault movement or by a coastal or submerged landslide. Tsunamis may be generated at great distance from shore (far field events) or nearby (near field events). Waves are formed, as the displaced water moves to regain equilibrium, and radiates across the open water, similar to ripples from a rock being thrown into a pond. When the waveform reaches the coastline, it quickly raises the water level, with water velocities as high as 15 to 20 knots. The water mass, as well as vessels, vehicles, or other objects in its path create tremendous forces as they impact coastal structures.

A tsunami or seiche originating in the Pacific Ocean would lose much of its energy passing through San Francisco Bay. Based on the study of tsunami inundation potential for the San Francisco Bay Area (Ritter and Dupre, 1972), areas most likely to be inundated are marshlands, tidal flats, and former bay margin lands that are now artificially filled, but are still at or below sea level, and are generally within 1½ miles of the shoreline. The site is approximately 2 miles inland from the San Francisco Bay shoreline, and is approximately 10 feet above mean sea level.

The California Geological Survey recently released tsunami inundation maps for the San Francisco Bay Area (CGS, 2009). In the south bay area, the tsunami inundation zone only extends several hundred feet into the flat lands along the southern shoreline of the bay. Based on this information, the potential for inundation due to tsunami or seiche may be considered low.

CONCLUSIONS AND RECOMMENDATIONS

GEOTECHNICAL DESIGN CONSIDERATIONS

Development of the site appears feasible from a geotechnical standpoint. This report and our preliminary conclusions and recommendations are intended to assist you for project planning purposes only. A design-level geotechnical investigation should be performed once development plans are finalized.

Potential geotechnical concerns, design considerations, and preliminary conclusions and recommendations are provided herein. A brief description of these concerns follows.

- Heavy Foundation Loads
- Liquefaction
- Expansive soils

Foundations

We understand that the current development plan includes a ten-story office building and a parking structure. Based on our review of subsurface data in the area and the anticipated building loads, we expect that the structures would need to be supported on a deep foundation system, such as driven piles or augercast piles. Pile lengths will depend on the building geometry, building loads, and pile spacing. For initial planning purposes, we estimate that a 100-ton (allowable) pile would need to be on the order of 70 to 80 feet long. This assumption is based on a 24-inch diameter concrete pile or square pile with an equivalent perimeter.

Additionally, due to the high liquefaction potential, the capacity of deep foundations above the potentially liquefiable soils may need to be neglected, resulting in decreased pile capacity and increased pile depth.

Liquefaction Potential

The site is located within a California Seismic Hazard Zone for liquefaction (CDMG, 2001) and a Santa Clara County Liquefaction Hazard Zone (SCC, 2002).

Based on our review of the soil and ground water conditions in the site vicinity, it is our opinion that there is a high potential liquefaction at the site. The potential for liquefaction should be evaluated during the design-level geotechnical investigation once the project plans are finalized. The liquefaction hazard at the site could likely be mitigated through foundation design.

Moderate to Highly Expansive Soils

The previous borings at the site encountered moderately to highly expansive surficial soils. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. Potential measures to reduce the potential for damage to the planned structures and slabs-on-grade, may include: employing grading and compaction methods to reduce potential volume change, providing sufficient reinforcement to resist expansive soil forces, and supporting foundations and/or slabs on a layer of non-expansive fill. It is important to limit moisture changes in the surficial soils by using positive drainage away from the building as well as limiting landscaping watering.

CLOSURE

The design considerations and preliminary recommendations contained in this report were based on limited site development information, geotechnical data collected by other consultants at the site, and published geologic information. We recommend that Cornerstone Earth Group be retained to 1) perform a design-level geotechnical investigation, once detailed site development plans are available; 2) to review the geotechnical aspects of the project structural, civil, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction; and 3) be present to provide geotechnical observation and testing during earthwork and foundation construction.

This report has been prepared for the sole use of David J. Powers & Associates for the proposed Samsung Corporate Headquarters to be located at 3655 North 1st Street in San Jose, California. Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices at this time and location. No warranties are expressed or implied.

If you have any questions or need any additional information from us, please call and we will be glad to discuss them with you.

Sincerely,

Cornerstone Earth Group, Inc.

REGISTERED PROFESSIONAL ENGINEER
DANH T. TRAN
C59705
EXP. 12/31/2013
CIVIL
STATE OF CALIFORNIA

Danh T. Tran, P.E.
Senior Principal Engineer

B. Wair

Bernard R. Wair, P.E., G.E.
Senior Project Engineer, LEED A.P.

DTT:BRW

Attachments:
Figure 1 – Vicinity Map
Figure 2 – Site Plan
Figure 3 – Geologic Map
Figure 4 – Regional Fault Map
Figure 5 – City of San Jose Fault Hazard Map
Figure 6 – Seismic Hazard Map
Boring Logs by Engeotech, Inc. (1983) – Borings B-1 to B-5
Boring Logs by Donald A. Banta & Associates (1994) – Borings EB-1 and EB-2

Copies: Addressee (by email)

REFERENCES

Association of Bay Area Governments, 1995, Dam Failure Inundation Hazard Areas – Los Gatos.

California Division of Mines and Geology, 1982, Special Studies Zones, Milpitas Quadrangle, Revised Official Map.

California Division of Mines and Geology, 2001, State of California Seismic Hazard Zones, Milpitas 7.5-Minute Quadrangle, Santa Clara County, California, Seismic Hazard Zone Report 051.

California Geological Survey, 2009, Tsunami Inundation Map for Emergency Planning, Milpitas Quadrangle, Santa Clara County, California, Scale 1:24000.

City of San Jose, 1983, Fault Hazard Maps – Milpitas Quadrangle.

Donald A. Banta & Associates, 1994, Foundation Investigation for Samsung Building Addition, Tasman and North First Street, San Jose, California, April 20.

Engeotech, Inc., 1983, Soil and Foundation Investigation for North First and Tasman Development, Two and Four-Story Buildings, North First Street and Tasman Drive, San Jose, California, May 16.

Federal Emergency Management Administration, 2009, Flood Insurance Rate Map, Santa Clara County and Unincorporated Areas, California, Community Panel #060085C0381H.

Knudsen, K.L., Sowers, J.M., Witter, R.C., Wentworth, C.M., Helley, E.J., Nicholson, R.S., Wright, H.M., and Brown, K.H., 2000, Preliminary Maps of Quaternary Deposits and Liquefaction Susceptibility, Nine-County San Francisco Bay Region, California, USGS Open-File Report 00-444.

Ritter, J.R., and Dupre, W.R., 1972, Map Showing Areas of Potential Inundation by Tsunamis in the San Francisco Bay Region, California: San Francisco Bay Region Environment and Resources Planning Study, USGS Basic Data Contribution 52, Misc. Field Studies Map MF-480.

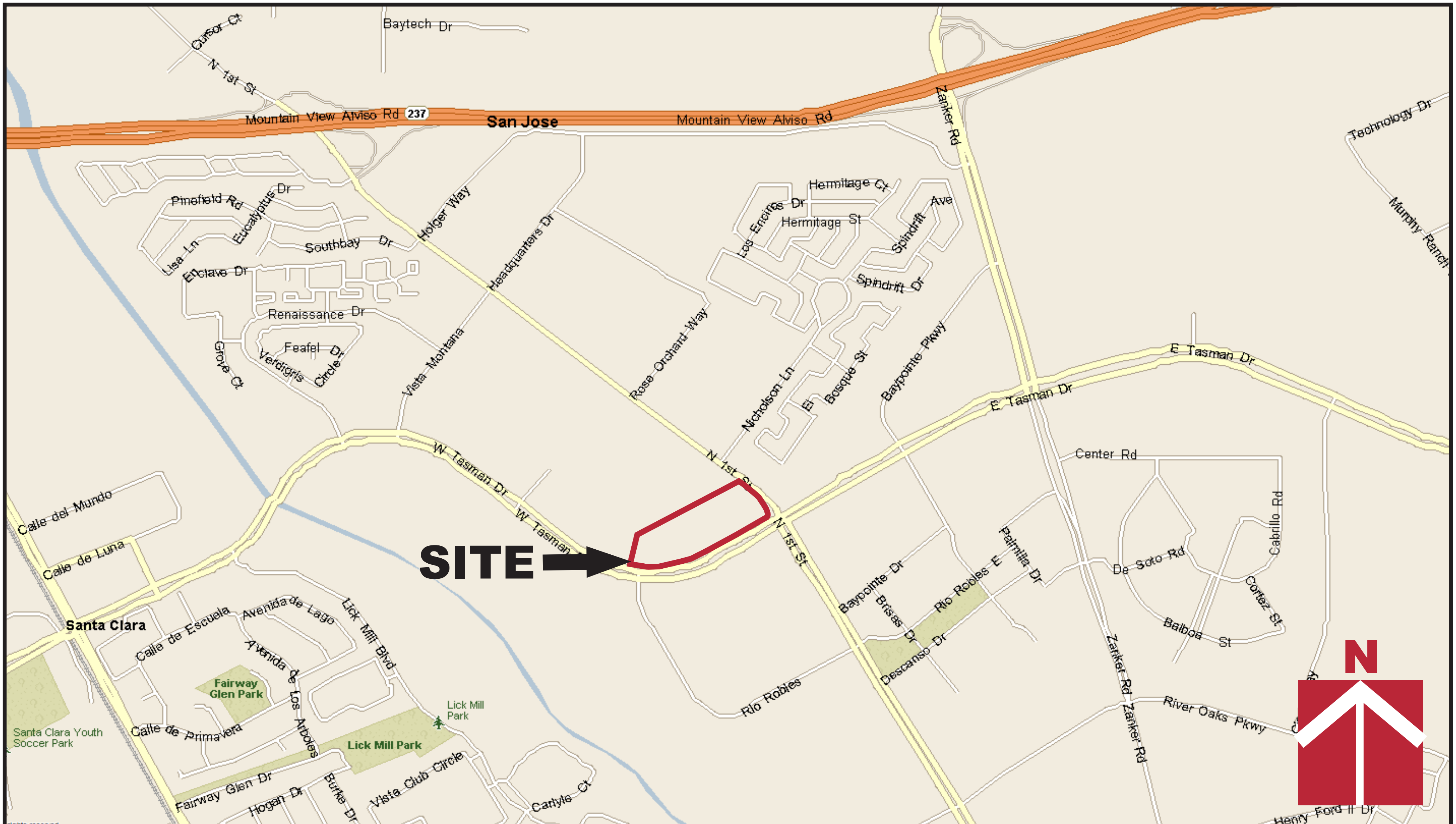
Rogers, T.H., and Williams, J.W., 1974 Potential Seismic Hazards in Santa Clara County, California, Special Report No. 107: California Division of Mines and Geology.

Santa Clara County, 2002, Fault Rupture Hazards Zones, Sheet 11.

Santa Clara County, 2002, Landslide Hazards Zones, Sheet 11.

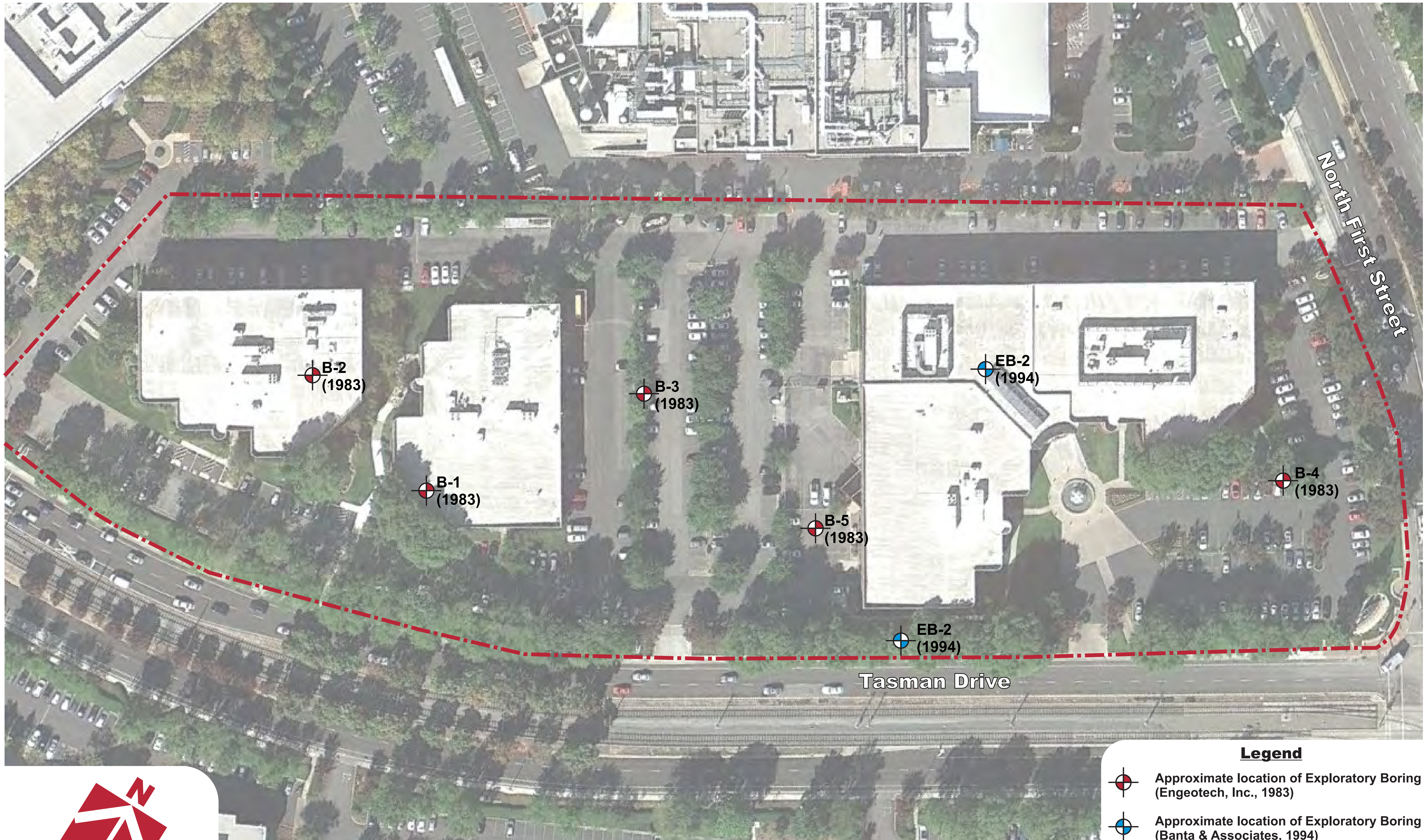
Santa Clara County, 2002, Liquefaction Hazards Zones, Sheet 11.

Wills, C.J., Petersen, M., Bryant, W.A., Reichle, M., Saucedo, G.J., Tan, S., Taylor, G., and Treiman, J., 2000, A Site-Conditions Map for California Based on Geology and Shear-Wave Velocity. Bulletin of the Seismological Society of America, Vol. 90(6B): S187-S208.



CORNERSTONE EARTH GROUP

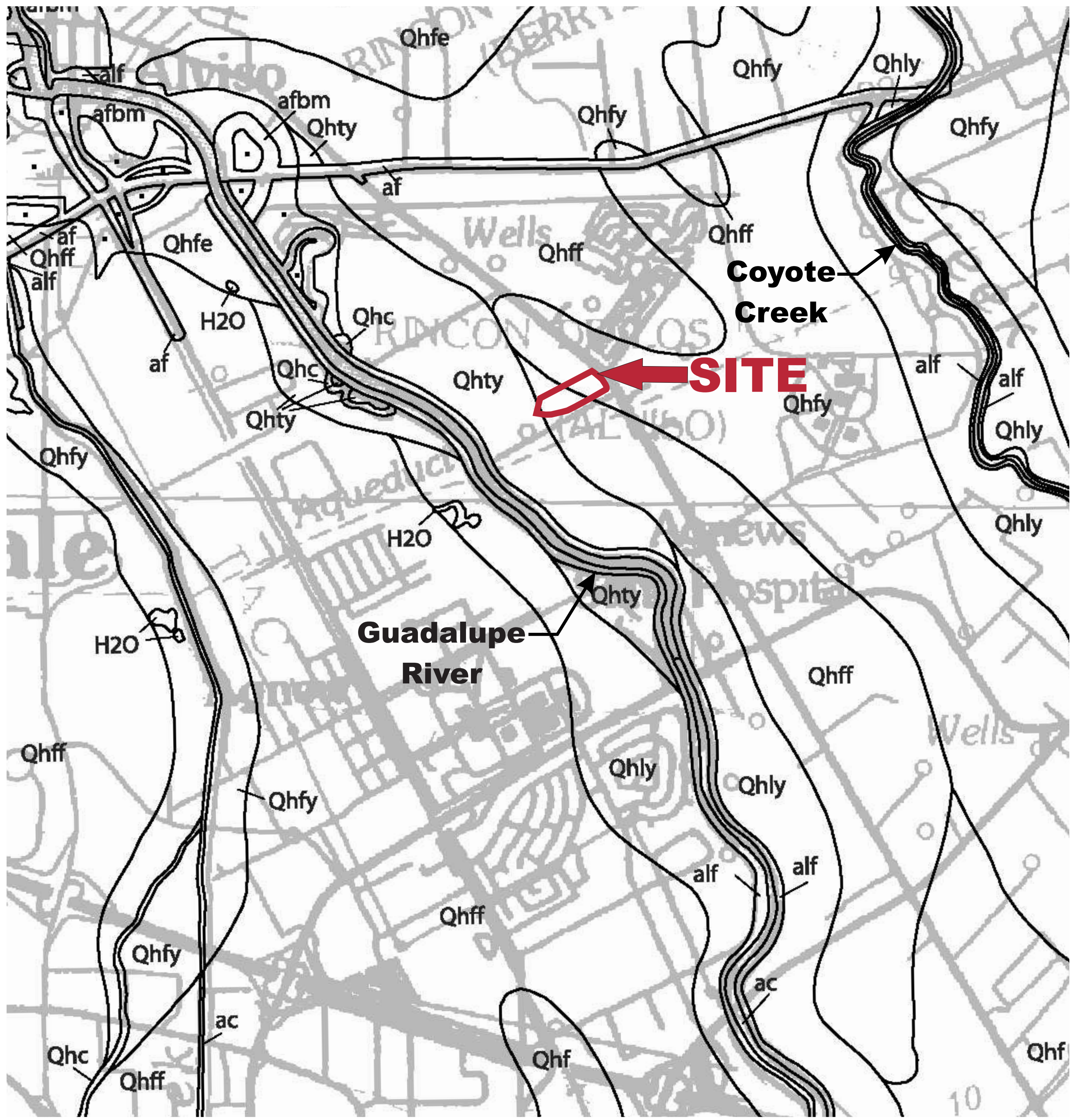
Vicinity Map	Project Number 118-37-2
Samsung Semiconductor Corporate Headquarters 3655 North First Street San Jose, CA	Figure Number Figure 1
	Date November 2012 / Drawn By RRN



Base by Google Earth, dated 10/31/2011

CORNERSTONE EARTH GROUP

Site Plan	Project Number 118-37-2
Samsung Semiconductor Corporate Headquarters 3655 North First Street San Jose, CA	Figure Number Figure 2
	Date November 2012 / Drawn By RRN



<u>Geologic Units</u>

Qhf, Qhff, Qhfy Alluvial Fan Deposits

Qhl, Qhly Levee Deposits

Qhty Terrace Deposits

alf Artifical Levee Fill

<u>Explanation</u>

Contact- dashed where approximate, dotted where concealed

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0 2500 5000

APPROXIMATE SCALE (FEET)

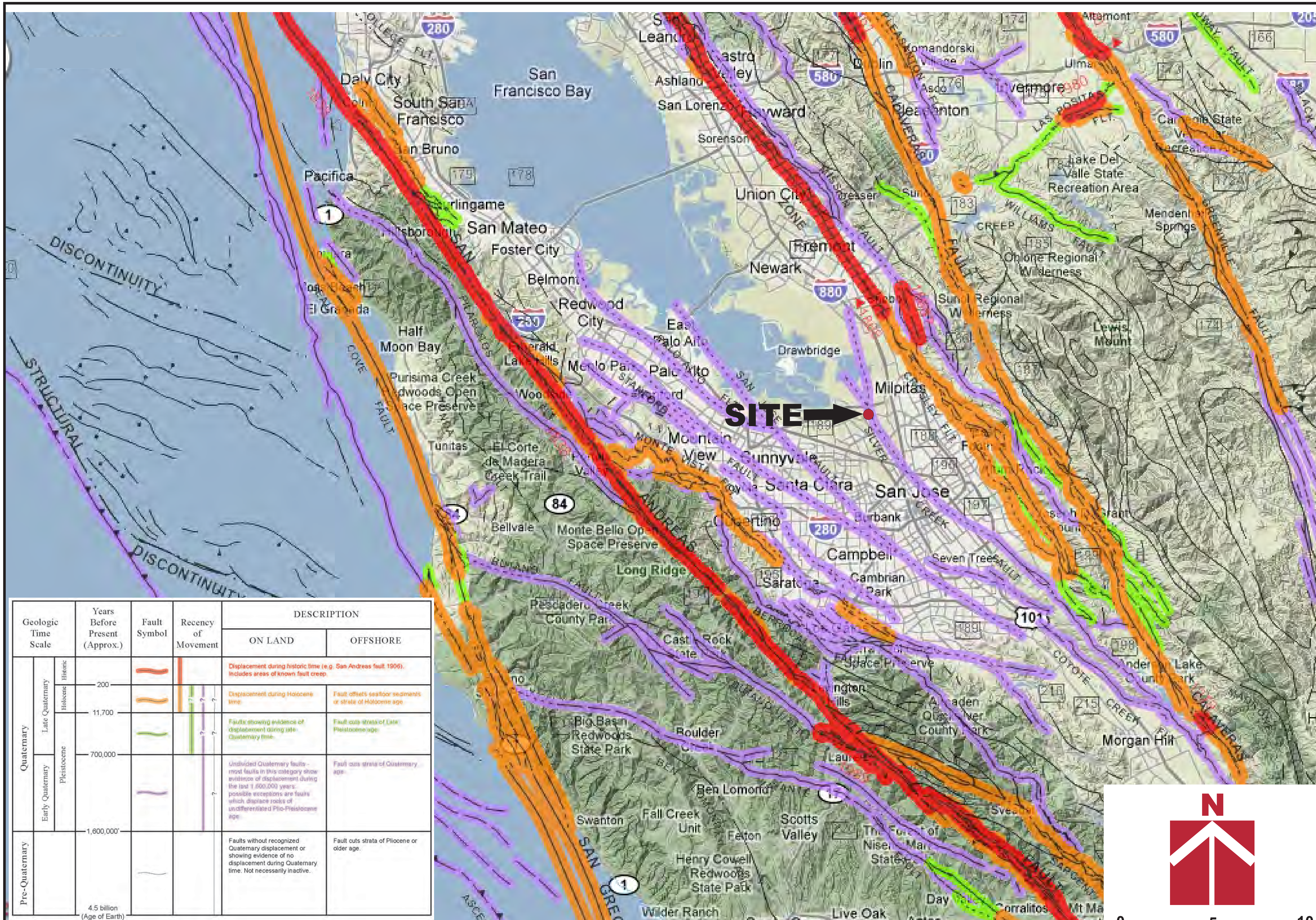
Base by CGS, 2004, Seismic Hazard Zone Report for the Milpitas Quadrangle

CORNERSTONE EARTH GROUP

Vicinity Geologic Map

Samsung Semiconductor Corporate Headquarters 3655 North First Street San Jose, CA

Project Number	118-37-2
Figure Number	Figure 3
Date November 2012	Drawn By RRN



Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION	
						ON LAND	OFFSHORE
Quaternary	Late Quaternary	Historic				Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	200			Displacement during Holocene time	Fault offsets seafloor sediments or strata of Holocene age
		Pleistocene	11,700			Faults showing evidence of displacement during late Quaternary time	Fault cuts strata of Late Pleistocene age
	Early Quaternary		700,000			Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age	Fault cuts strata of Quaternary age
Pre-Quaternary			1,600,000*			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.
			4.5 billion (Age of Earth)				

N

0 5 10

APPROXIMATE SCALE (MILES)

Base by California Geological Survey - 2010 Fault Activity Map of California (Jennings and Bryant, 2010)

Project Number 118-37-2

Figure Number Figure 4

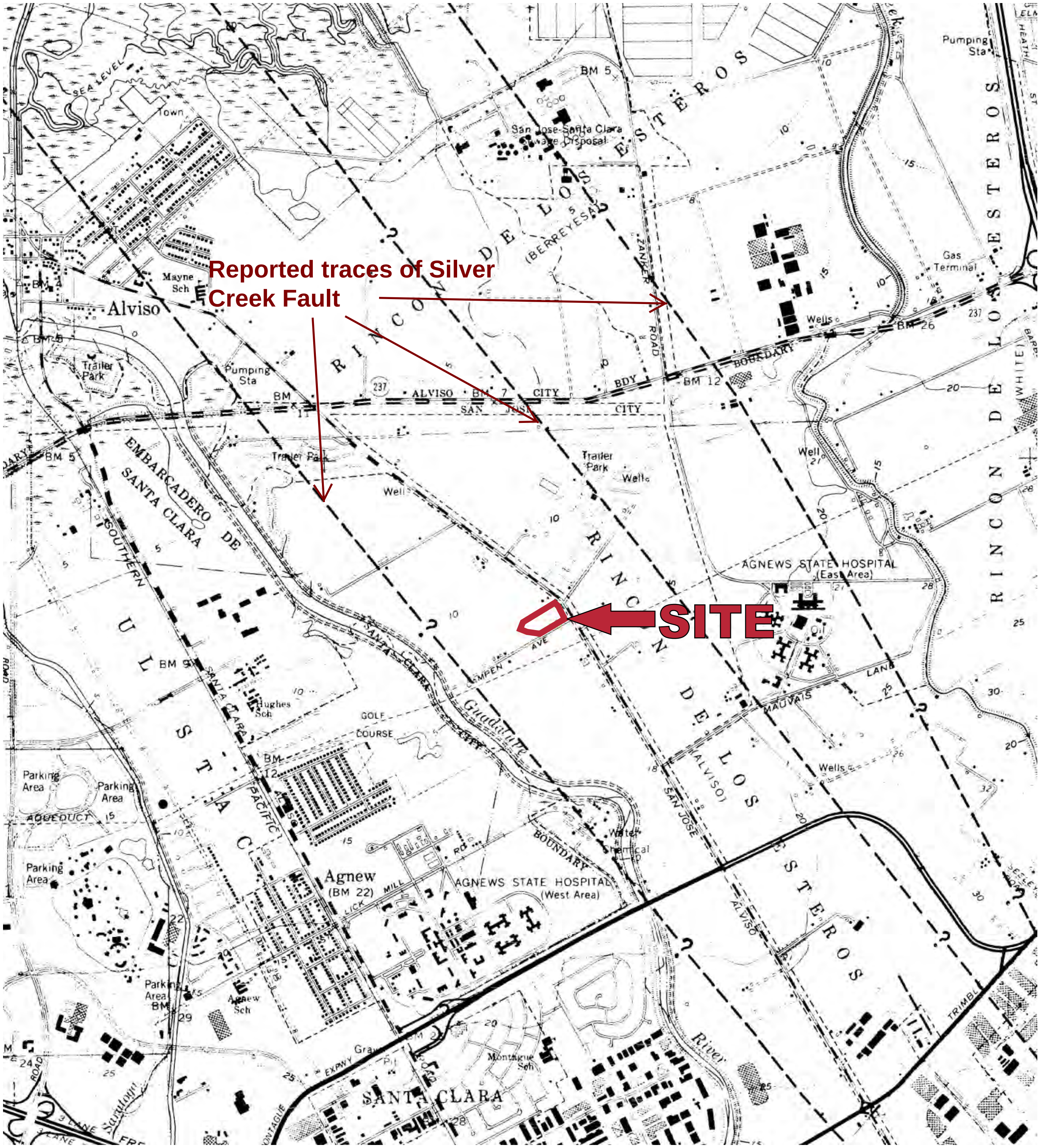
Date November 2012

Drawn By RRN

Regional Fault Map

Samsung Semiconductor Corporate Headquarters
3655 North First Street
San Jose, CA

CORNERSTONE EARTH GROUP



Explanation

Alquist-Priolo Special Studies Zone

City of San Jose Potential Hazard Zone

---?– Reported Faults

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0 2500 5000

APPROXIMATE SCALE (FEET)

Base by City of San Jose (1983) Fault Hazard Map, Milpitas Quadrangle

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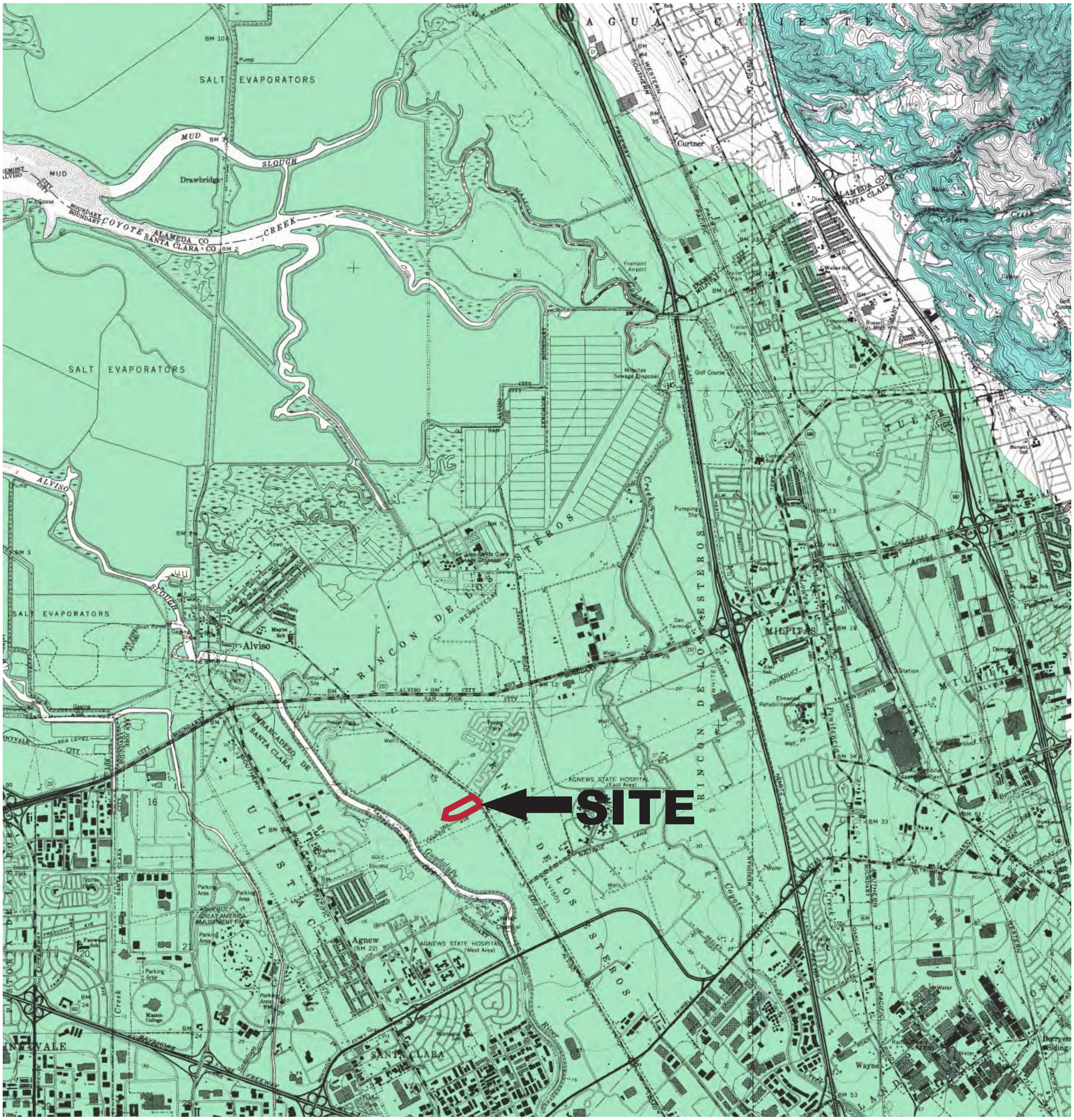
City of San Jose Fault Hazard Map	Project Number	118-37-2
Samsung Semiconductor Corporate Headquarters 3655 North First Street San Jose, CA	Figure Number	Figure 5
	Date November 2012	Drawn By RRN



Explanation

Liquefaction

Areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslides

Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

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0 5000 10000

APPROXIMATE SCALE (FEET)

Base by CGS, 2004, Milpitas Quandrangle Seismic Hazard Zones

CORNERSTONE EARTH GROUP	Seismic Hazard Map	Project Number 118-37-2
	Samsung Semiconductor Corporate Headquarters 3655 North First Street San Jose, CA	Figure Number Figure 6
		Date November 2012 / Drawn By RRN

ATTACHMENT 1

Borings from "Soil and Foundation Investigation for North First and Tasman Development, Two and Four-Story Buildings, North First Street and Tasman Drive, San Jose, California," prepared by Engeotech, Inc., dated May 16, 1983.

- Borings B-1 through B-5
- Plasticity Index Chart

EXPLORATORY BORING LOG

JOB NO. ET3-0237-S1 DATE DRILLED 5-12-1983

BORING NO. B-1 LOGGED BY M.H.

IN PLACE							
DRY DENSITY P.C.F.	MOISTURE CONTENT % DRY WT.	PENETRATION RESISTANCE BLOWS/FT.	UNCONFINED COMP. STRENGTH K.S.F.	SAMPLE NO.	DEPTH IN FT.	BORING LOG	DESCRIPTION & REMARKS
							Brown silty Clay; Wet, medium stiff to stiff
95.4	23.6	41	4.5	1-1	3-4		
							Reddish brown silty Clay; Wet, stiff
101.4	18.3	28		1-2	9-10		
							Similar Material Minor Sand
							Water @ 13'
							Bluish gravelly Sand; Wet, dense Coarse grained Sand
107.1	13.1	21		1-3	15-16		
							Reddish brown silty Clay; Wet, medium stiff
							Light brown silty Clay; Wet, stiff
							Boring terminated @ 25'

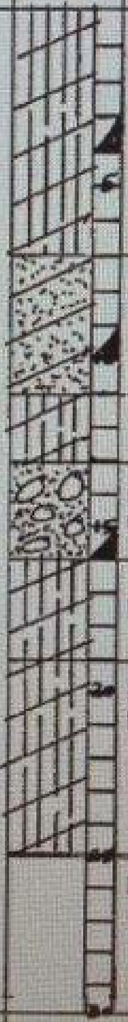

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FIGURE NO. 2 - LOG OF TEST BORING

EXPLORATORY BORING LOG

JOB NO. ET3-0237-S1

DATE DRILLED 5-12-1983

BORING NO. B-2

LOGGED BY M.H.

IN PLACE							
DRY DENSITY P.C.F.	MOISTURE CONTENT % DRY WT.	PENETRATION RESISTANCE BLOWS/FT.	UNCONFINED COMP. STRENGTH K.S.F.	SAMPLE NO.	DEPTH IN FT.	BORING LOG	DESCRIPTION & REMARKS
							Brown silty Clay; Wet, medium stiff to stiff
100.8	20.5	39		2-1	4-5		
							Reddish brown silty Clay; Wet, very stiff
103.2	22.0	43		2-2	11-12		
							Grey silty Clay; Wet, stiff
							Light brown silty Sand; Wet, dense
105.8	12.6	29		2-3	17-18		
							Light brown silty Clay; Wet, stiff
							Boring terminated @ 20'

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FIGURE NO. 3 - LOG OF TEST BORING

EXPLORATORY BORING LOG

JOB NO. ET3-0237-S1 DATE DRILLED 5-12-1983

BORING NO. B-3 LOGGED BY M.H.

IN PLACE							
DRY DENSITY P.C.F.	MOISTURE CONTENT % DRY WT.	PENETRATION RESISTANCE BLOWS/FT.	UNCONFINED COMP. STRENGTH K.S.F.	SAMPLE NO.	DEPTH IN FT.	BORING LOG	DESCRIPTION & REMARKS
94.3	26.2	28		3-1	2-3		Brown silty Clay; Wet, medium stiff to stiff
							Reddish brown silty Clay; Wet, stiff
							Water @ 12' Grey silty Clay; Wet, stiff
104.6	18.2	32		3-2	16-17		Light brown silty Sand w/gravels; Wet, dense
							Reddish brown sandy Clay; Wet, stiff
							Boring terminated @ 20'

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FIGURE NO. 4 - LOG OF TEST BORING

EXPLORATORY BORING LOG

JOB NO. ET3-0237-S1

DATE DRILLED 5-12-1983

BORING NO. B-4

LOGGED BY M.H.

IN PLACE							
DRY DENSITY P.C.F.	MOISTURE CONTENT % DRY WT.	PENETRATION RESISTANCE BLOWS/FT.	UNCONFINED COMP. STRENGTH K.S.F.	SAMPLE NO.	DEPTH IN FT.	BORING LOG	DESCRIPTION & REMARKS
							Brown silty Clay; Wet, stiff
							Light brown silty Clay; Wet, stiff
							Similar material but reddish brown color Water @ 11'
107.1	11.5	36		4-1	12-13		Bluish sandy Gravels; Wet, very dense Gravels upto half inch
							Light brown sandy Clay; Wet, stiff
							Boring terminated @ 20'

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FIGURE NO. 5 - LOG OF TEST BORING

EXPLORATORY BORING LOG

JOB NO. ET3-0237-S1 DATE DRILLED 5-12-1983

BORING NO. B-5 LOGGED BY M.H.

IN PLACE							
DRY DENSITY P.C.F.	MOISTURE CONTENT % DRY WT.	PENETRATION RESISTANCE BLOWS/FT.	UNCONFINED COMP. STRENGTH K.S.F.	SAMPLE NO.	DEPTH IN FT.	BORING LOG	DESCRIPTION & REMARKS
102.0	21.7	41		5-1	3-4		Brown silty Clay; Wet, stiff
							Light brown silty Clay; Wet, very stiff
							Water @ 12' Bluish sand w/gravels; Wet, dense
106.0	18.9	33		5-2	17-18		Reddish brown sandy Clay; Wet, stiff
							Boring terminated @ 20'

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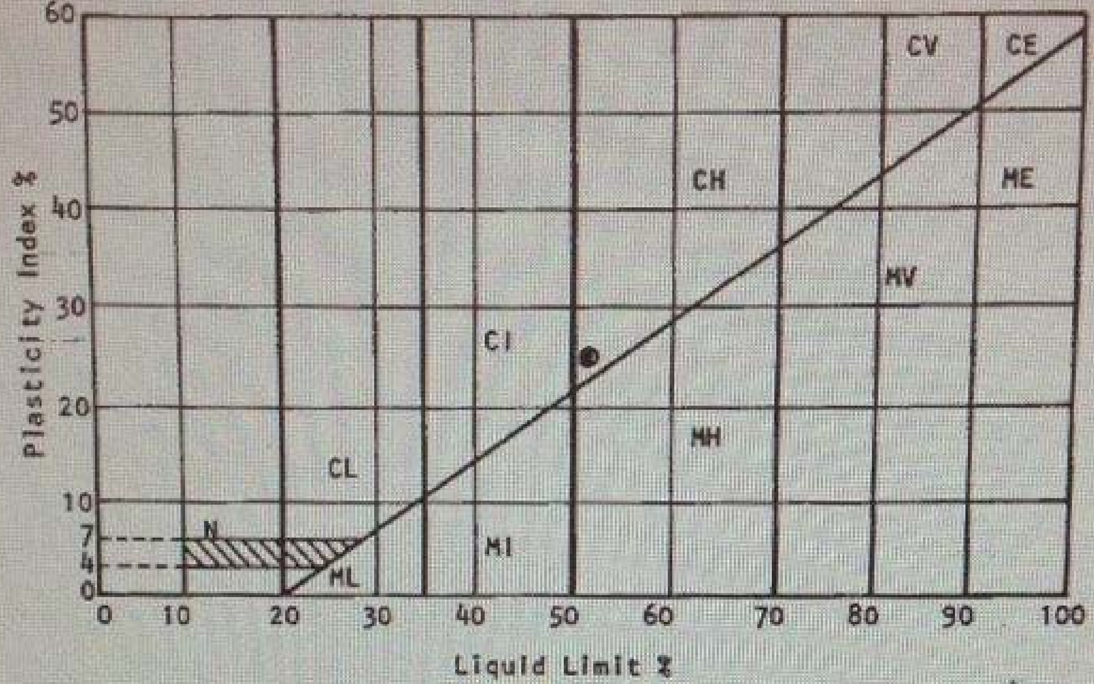
FIGURE NO. 6 - LOG OF TEST BORING

PLASTICITY CHART



PLASTICITY DATA

Key Symbol	Hole No.	Depth Ft.	Liquid Limit %	Plasticity Index %	Unified Soil Classification Symbol*
o	BAG "A"	1-1.5	51.4	24.3	CH

* Soil type classification based on British suggested revisions to Unified Soils Classification System

Figure 7 - Atterberg Limit Tests

ATTACHMENT 2

Borings from "Foundation Investigation for Samsung Building Addition, Tasman and North First Street, San Jose, California," prepared by Donald A. Banta & Associates, dated April 20, 1994.

- Borings EB-1 and EB-2
- Plasticity Index Chart

Unified Soil Classification System (ASTM D-2487)

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS LARGER THAN # 200 SIEVE SIZE	GRAVELS — MORE THAN HALF OF COARSE FRACTION IS LARGER THAN # 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS — MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN # 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS SMALLER THAN # 200 SIEVE SIZE	SILTS AND CLAYS — LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS — LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays and silty clays of high plasticity, fat clays
			OH	Organic clays and silts of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

DEFINITION OF TERMS

CLEAR SQUARE SIEVE OPENINGS

75 µm — 425 µm — 2 mm — 4.75 mm — 3/4" — 3" — 12" — [illegible]

SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

#200 — #40 — #10 — #4 ← American Standard Sieve Sizes

GRAIN SIZES

SANDS AND GRAVELS	BLOWS / FOOT†
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH*	BLOWS / FOOT†
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

CONSISTENCY

†Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8" I.D.) split spoon (ASTM D 1586).
*Unconfined compressive strength in tons/sq.ft. as determined by laboratory testing or approximated by pocket penetrometer, torvane, or visual observation.

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KEY TO EXPLORATORY BORING LOGS

BUILDING ADDITION - TASMAN & NORTH FIRST STREET
San Jose, California

Project 111-167 — April 1994 — Figure A-1

Drill Rig Continuous Flight Auger	Surface Elevation ——	Logged By GC
Groundwater Depth ~15.0 feet	Boring Diameter 6 inches	Date Drilled 4/8/94

DESCRIPTION AND CLASSIFICATION / SAMPLE DATA

DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE	Depth (Feet)	SAMPLER	Blows Per Foot	Percent Moisture	Dry Density (Pcf)	Plasticity Index / Liquid Limit (%)	Percent Passing #200 Sieve	Shear Strength (Ksf)
8.5 inches Asphaltic Concrete											
SILTY AND SANDY CLAY, mixed with gravel FILL	brown	stiff	CL	1							
SILTY CLAY	dark gray	very stiff	CH	2	x	20	19 / 18	111		78	5.0+(t)
Note: "(p)" indicates shear strength by pocket penetrometer "(t)" indicates shear strength by Torvane "x" indicates location of sample				5	x	31	20			95	5.0+(t)
SILTY CLAY, with fine sand	brown	very stiff	CL	10		60	16	113		71	4.0(t)
(increasing moisture at 15 feet)				15	x	17	22 (5 min AD)			76	3.0(p)
— — — ? — — — — — — ? — — —											
SAND, fine-grained with silt	brown	medium dense	SP SM	20		21	23	105		4	
— — — ? — — — — — — ? — — —											
SANDY SILT	gray and brown	dense	ML	25	x	44	26			71	
— — — ? — — — — — — ? — — —											
SILTY CLAY	gray green	stiff	CL-CH	26							

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EXPLORATORY BORING LOG 1

BUILDING ADDITION - TASMAN & NORTH FIRST STREET
San Jose, California

Project 111-167 April 1994 Sheet 1 of 2

Drill Rig Continuous Flight Auger	Surface Elevation —	Logged By GC
Groundwater Depth ~15.0 feet	Boring Diameter 6 inches	Date Drilled 4/8/94

DESCRIPTION AND CLASSIFICATION				Depth (Feet)	SAMPLER	SAMPLE DATA					
DESCRIPTION AND REMARKS	COLOR	CONSIS-TENCY	SOIL TYPE			Blows Per Foot	Percent Moisture	Dry Density (Pcf)	Plasticity Index / Liquid Limit (%)	Percent Passing #200 Sieve	Shear* Strength (Ksf)
SILTY CLAY (contd.)	gray green	stiff	CL-CH	27							
				28							
				29							
				30	X	26	34			94	1.2 (t)
Bottom of Boring = 30.5 feet				31							
				32							
				33							
				34							
				35							
				36							
				37							
				38							
				39							
				40							
				41							
				42							
				43							
				44							
				45							
				46							
				47							
				48							
				49							
				50							
				51							
				52							

Drill Rig Continuous Flight Auger	Surface Elevation	Logged By GC
Groundwater Depth ~13.0 feet	Boring Diameter 6 inches	Date Drilled 4/8/94

DESCRIPTION AND CLASSIFICATION				Depth (Feet)	SAMPLER	SAMPLE DATA					
DESCRIPTION AND REMARKS	COLOR	CONSISTENCY	SOIL TYPE			Blows Per Foot	Percent Moisture	Dry Density (Pcf)	Plasticity Index / Liquid Limit (%)	Percent Passing #200 Sieve	Shear Strength (Ksf)
3 inches Asphaltic Concrete over 4 inches Aggregate Base				1							
CLAYEY SAND AND SILTY CLAY, mixed gravel	brown	stiff	SC-CL		x		11			37	
FILL				2	x	41	15			72	
SILTY CLAY	dark gray	very stiff	CH	3							
				4							
				5	■	53	20	103	33/52	87	3.5(t)
				6							
— — — ? — — — — — ? — —				7							
SILTY CLAY, with fine sand	brown	very stiff	CL	8							
Note: "(p)" indicates shear strength by pocket penetrometer				9							
"(t)" indicates shear strength by Torvane				10	x	40	22			79	4.2(p)
"x" indicates location of sample				11							
				12							
		firm		13			ATD				
				14	x		27			60	0.7(p)
				15	x	13	23			54	
SANDY SILT - SILTY SAND	brown	medium dense	ML-SM	16							
				17							
SANDY CLAY, with fine sand	brown with gray	firm to stiff	CL	18							
				19							
				20	x	8	28			72	1.0(t)
Bottom of Boring = 20.5 feet				21							
				22							
				23							
				24							
				25							
				26							

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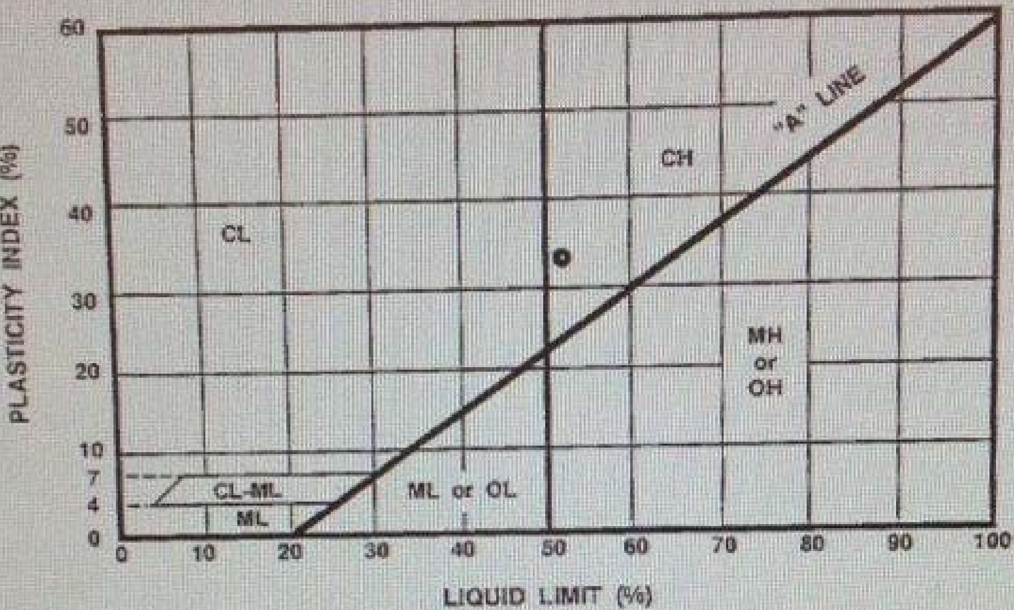
EXPLORATORY BORING LOG 2

BUILDING ADDITION - TASMAN & NORTH FIRST STREET
San Jose, California

Project 111-167 | April 1994 | Sheet 1 of 1



KEY SYMBOL	BORING NUMBER	SAMPLE DEPTH (Feet)	NATURAL WATER CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	PASSING No. 200 SIEVE (%)	LIQUIDITY INDEX	UNIFIED SOIL CLASS-IFICATION SYMBOL
●	EB-2	5	20	52	33	87	--	CH

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PLASTICITY CHART AND DATA

BUILDING ADDITION - TASMAN & NORTH FIRST STREET
San Jose, California

Project 111-167 | April 1994 | Figure B-1